CLAIMS

WHAT IS CLAIMED:

1. A method comprising:

monitoring consumption of a sputter target to determine a deposition rate of a metal layer during metal deposition processing using the sputter target;

modeling a dependence of the deposition rate on at least one of deposition plasma power and deposition time; and

applying the deposition rate model to modify the metal deposition processing to form the metal layer to have a desired thickness.

2. The method of claim 1, wherein monitoring the consumption of the sputter target to determine the deposition rate of the metal layer during the metal deposition processing comprises modeling a dependence of the deposition rate on a target life of the sputter target.

3. The method of claim 1, wherein modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises modeling the dependence of the deposition rate on both the deposition plasma power and the deposition time.

4. The method of claim 2, wherein modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises modeling the dependence of the deposition rate on both the deposition plasma power and the deposition time.

5. The method of claim 1, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the at least one of the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

6. The method of claim 2, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the at least one of the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

7. The method of claim 3, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

8. The method of claim 4, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

9. The method of claim 1, wherein modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises fitting previously collected metal deposition processing data using at least one of polynomial curve fitting, least-squares fitting, polynomial least-squares fitting, non-polynomial

least-squares fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting.

10. The method of claim 2, wherein modeling the dependence of the deposition rate on the target life of the sputter target comprises fitting previously collected metal deposition processing data using at least one of polynomial curve fitting, least-squares fitting, polynomial least-squares fitting, non-polynomial least-squares fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting.

11. A computer-readable, program storage device, encoded with instructions that, when executed by a computer, perform a method comprising:

monitoring consumption of a sputter target to determine a deposition rate of a metal layer during metal deposition processing using the sputter target;

modeling a dependence of the deposition rate on at least one of deposition plasma power and deposition time; and

applying the deposition rate model to modify the metal deposition processing to form the metal layer to have a desired thickness.

12. The device of claim 11, wherein monitoring the consumption of the sputter target to determine the deposition rate of the metal layer during the metal deposition processing comprises modeling a dependence of the deposition rate on a target life of the sputter target.

13. The device of claim 11, wherein modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises modeling the dependence of the deposition rate on both the deposition plasma power and the deposition time.

14. The device of claim 12, wherein modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises modeling the dependence of the deposition rate on both the deposition plasma power and the deposition time.

15. The device of claim 11, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the at least one of the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

16. The device of claim 12, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the at least one of the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

17. The device of claim 13, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

18. The device of claim 14, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

19. The device of claim 11, wherein modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises fitting previously collected metal deposition processing data using at least one of polynomial curve fitting, least-squares fitting, polynomial least-squares fitting, non-polynomial least-squares fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting.

20. The device of claim 12, wherein modeling the dependence of the deposition rate on the target life of the sputter target comprises fitting previously collected metal deposition processing data using at least one of polynomial curve fitting, least-squares fitting, polynomial least-squares fitting, non-polynomial least-squares fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting.

21. A computer programmed to perform a method comprising:

monitoring consumption of a sputter target to determine a deposition rate of a metal layer during metal deposition processing using the sputter target;

modeling a dependence of the deposition rate on at least one of deposition plasma power and deposition time; and

applying the deposition rate model to modify the metal deposition processing to form the metal layer to have a desired thickness.

22. The computer of claim 21, wherein monitoring the consumption of the sputter target to determine the deposition rate of the metal layer during the metal deposition processing comprises modeling a dependence of the deposition rate on a target life of the sputter target.

23. The computer of claim 21, wherein modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises modeling the dependence of the deposition rate on both the deposition plasma power and the deposition time.

24. The computer of claim 22, wherein modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises modeling the dependence of the deposition rate on both the deposition plasma power and the deposition time.

25. The computer of claim 21, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the at least one of the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

26. The computer of claim 22, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to

determine the at least one of the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

27. The computer of claim 23, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

28. The computer of claim 24, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

29. The computer of claim 21, wherein modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises fitting previously collected metal deposition processing data using at least one of polynomial curve fitting, least-squares fitting, polynomial least-squares fitting, non-polynomial least-squares fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting.

30. The computer of claim 22, wherein modeling the dependence of the deposition rate on the target life of the sputter target comprises fitting previously collected metal deposition processing data using at least one of polynomial curve fitting, least-squares fitting, polynomial least-squares fitting, non-polynomial least-squares fitting, weighted least-squares

fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting.

31. A method comprising:

monitoring consumption of a sputter target to determine a deposition rate of a metal layer during metal deposition processing using the sputter target by modeling a dependence of the deposition rate on a target life of the sputter target;

modeling a dependence of the deposition rate on at least one of deposition plasma power and deposition time; and

applying the deposition rate model to modify the metal deposition processing to form the metal layer to have a desired thickness.

32. The method of claim 31, wherein modeling the dependence of the deposition rate on the target life of the sputter target comprises modeling the dependence of the deposition rate on target lives of a plurality of previously processed sputter targets.

33. The method of claim 31, wherein modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises modeling the dependence of the deposition rate on both the deposition plasma power and the deposition time.

34. The method of claim 32, wherein modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises

modeling the dependence of the deposition rate on both the deposition plasma power and the deposition time.

35. The method of claim 31, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the at least one of the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

36. The method of claim 32, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the at least one of the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

37. The method of claim 33, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

38. The method of claim 34, wherein applying the deposition rate model to modify the metal deposition processing comprises inverting the deposition rate model to determine the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

39. The method of claim 31, wherein modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises

fitting previously collected metal deposition processing data using at least one of polynomial curve fitting, least-squares fitting, polynomial least-squares fitting, non-polynomial least-squares fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting.

40. The method of claim 32, wherein modeling the dependence of the deposition rate on the target lives of the plurality of previously processed sputter targets comprises fitting previously collected metal deposition processing data using at least one of polynomial curve fitting, least-squares fitting, polynomial least-squares fitting, non-polynomial least-squares fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting.

41. A system comprising:

a tool monitoring consumption of a sputter target to determine a deposition rate of a metal layer during metal deposition processing using the sputter target;

a computer modeling a dependence of the deposition rate on at least one of deposition plasma power and deposition time; and

a controller applying the deposition rate model to modify the metal deposition processing to form the metal layer to have a desired thickness.

42. The system of claim 41, wherein the tool monitoring the consumption of the sputter target to determine the deposition rate of the metal layer during the metal deposition processing models a dependence of the deposition rate on a target life of the sputter target.

43. The system of claim 41, wherein the computer modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time models the dependence of the deposition rate on both the deposition plasma power and the deposition time.

44. The system of claim 42, wherein the computer modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time models the dependence of the deposition rate on both the deposition plasma power and the deposition time.

45. The system of claim 41, wherein the controller applying the deposition rate model to modify the metal deposition processing inverts the deposition rate model to determine the at least one of the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

46. The system of claim 42, wherein the controller applying the deposition rate model to modify the metal deposition processing inverts the deposition rate model to determine the at least one of the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

47. The system of claim 43, wherein the controller applying the deposition rate model to modify the metal deposition processing inverts the deposition rate model to determine the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

48. The system of claim 44, wherein the controller applying the deposition rate model to modify the metal deposition processing inverts the deposition rate model to determine the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

49. The system of claim 41, wherein the computer modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time fits previously collected metal deposition processing data using at least one of polynomial curve fitting, least-squares fitting, polynomial least-squares fitting, non-polynomial least-squares fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting.

50. The system of claim 42, wherein the tool modeling the dependence of the deposition rate on the target life of the sputter target fits previously collected metal deposition processing data using at least one of polynomial curve fitting, least-squares fitting, polynomial least-squares fitting, non-polynomial least-squares fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting.

51. A device comprising:

means for monitoring consumption of a sputter target to determine a deposition rate of a metal layer during metal deposition processing using the sputter target;

means for modeling a dependence of the deposition rate on at least one of deposition plasma power and deposition time; and

means for applying the deposition rate model to modify the metal deposition processing to form the metal layer to have a desired thickness.

52. The device of claim 51, wherein the means for monitoring the consumption of the sputter target to determine the deposition rate of the metal layer during the metal deposition processing comprises means for modeling a dependence of the deposition rate on a target life of the sputter target.

53. The device of claim 51, wherein the means for modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises means for modeling the dependence of the deposition rate on both the deposition plasma power and the deposition time.

54. The device of claim 52, wherein the means for modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises means for modeling the dependence of the deposition rate on both the deposition plasma power and the deposition time.

55. The device of claim 51, wherein the means for applying the deposition rate model to modify the metal deposition processing comprises means for inverting the deposition rate model to determine the at least one of the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

56. The device of claim 52, wherein the means for applying the deposition rate model to modify the metal deposition processing comprises means for inverting the

deposition rate model to determine the at least one of the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

57. The device of claim 53, wherein the means for applying the deposition rate model to modify the metal deposition processing comprises means for inverting the deposition rate model to determine the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

58. The device of claim 54, wherein the means for applying the deposition rate model to modify the metal deposition processing comprises means for inverting the deposition rate model to determine the deposition plasma power and the deposition time to form the metal layer to have the desired thickness.

59. The device of claim 51, wherein the means for modeling the dependence of the deposition rate on the at least one of the deposition plasma power and the deposition time comprises means for fitting previously collected metal deposition processing data using at least one of polynomial curve fitting, least-squares fitting, polynomial least-squares fitting, non-polynomial least-squares fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting.

60. The device of claim 52, wherein the means for modeling the dependence of the deposition rate on the target life of the sputter target comprises means for fitting previously collected metal deposition processing data using at least one of polynomial curve fitting, least-squares fitting, polynomial least-squares fitting, non-polynomial least-squares

fitting, weighted least-squares fitting, weighted polynomial least-squares fitting, and weighted non-polynomial least-squares fitting.